# Evaluation of the skill and added value of a reanalysis-driven regional simulation for alpine temperature

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A high-resolution regional climate simulation has been performed with the REMO model with spectral nudging applied for the whole of Europe for the period 1958-1998. The REMO simulation and the driving ERA40 reanalysis are validated against station data for 2 m temperature over the Greater Alpine Region. The temporal variability, as quantified by correlation, is well represented by both ERA and REMO. However, both models show considerable biases. For the REMO simulation the bias reaches 3 K in summer in regions known to experience a problem with summer drying in a number of regional models. In winter the bias for the REMO simulation is negligible except for the high-elevation stations, where it is highly negative (-3.5 K) and probably caused by an altitude correction, which is needed to compare grid box and station data at different altitudes, but which may not be fully realistic. The ERA40 reanalysis has the same bias for the high-elevation stations, whereas the bias differs from the REMO bias in the other regions showing largest bias in winter (2.8 K).

We also analyse the added value of the higher resolution regional simulation compared to the reanalysis. It varies between the seasons and regions and in some regions it also depends on the selection of stations used for the validation. Robust features include in summer a better performance of REMO in the inner Alpine subregions and a worse performance to the east of the Alps. The lack of consistent value added by REMO in our hindcast setup may be partly explicable by the fact that meteorological measurements are assimilated only in the ERA reanalysis.